



# Alston & Bird LLP

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December 1, 2004

Certificate  
DEC 08 2004  
of Correction

Certificate of Correction Branch  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Re: United States Patent for *Optical Device and Display Apparatus  
Using Light Diffraction and Light Guide*  
Application No. 10/615,571; Filed July 8, 2003  
Patent No. 6,819,393; Issued November 16, 2004  
Our File 041309/262110

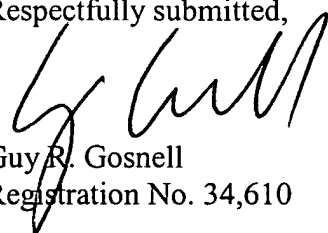
Sir:

It is respectfully requested that a Certificate of Correction be issued for the above-identified patent, in accordance with 37 C.F.R. §1.322. This request is made in order to correct the mistakes incurred through the fault of the United States Patent and Trademark Office ("USPTO").

**As supporting evidence for the changes being made to the claims, Applicant encloses a copy of the Preliminary Amendment filed July 8, 2003, along with the originally filed application and a copy of the Notice of Allowability with the Examiner's Amendment. Note that the Examiner refers to Claim 156 and 157 as being (Twice Amended), which would indicate that the Examiner entered the Preliminary Amendment of record during the prosecution of this application. Applicant further notes that the Preliminary Amendment is of record in PAIR.**

The mistakes appearing in the patent are set forth on the Certificate of Correction enclosed herewith, with an additional copy thereof and a postal card being enclosed in accordance with the present USPTO practice.

Respectfully submitted,

  
Guy R. Gosnell  
Registration No. 34,610

/kc  
Enclosures  
CLT01/4682706v1

13 DEC 2004

# UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 6,819,393 B1  
DATED : November 16, 2004  
INVENTOR(S) : Date et al.

Page 1 of 8

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 22,

Line 34, after the paragraph ending "Pixel Units.", insert the following:

--(I) When the upper electrode is a single sheet of transparent electrode in the display area, and the lower electrode is a comb-shaped electrode divided into display pixel units.--.

Column 33,

Line 9, claim 2 (formerly claim 44) should read:

2. An optical device according to claim 1 wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal changing in refractive index or absorptivity or scattering degree by an electric field applied by said first electrode and said second electrode, which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

Line 37, claim 3 (formerly claim 51) should read:

3. The optical device as claimed in claim 2, wherein at least one of said first electrode and second electrode comprises an electrode group divided into strips, when both of said first electrode and second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

Line 45, claim 4 (formerly claim 58) should read:

4. The optical device as claimed in claim 2, wherein at least one of said first electrode and second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

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DATED : November 16, 2004

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Line 49, claim 5 (formerly claim 69) should read:

5. The optical device as claimed in claim 2, wherein said optical device receives light from an illumination means having at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.

Line 55, claim 6 (formerly claim 78) should read:

6. An optical device as claimed in claim 1 further comprising a reflection film provided on the lower surface of said optical control layer, wherein said second electrode is provided on a lower surface of said reflection film.

## Column 34.

Line 8, claim 8 (formerly claim 82) should read:

8. The optical device as claimed in claim 6, wherein at least one of said first electrode and said second electrode comprises an electrode group divided into strips, when both of said first electrode and said second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

Line 16, claim 9 (formerly claim 85) should read:

9. The optical device as claimed in claim 6, wherein at least one of said first electrode and said second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

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Line 19, claim 10 (formerly claim 95) should read:

10. The optical device as claimed in claim 6, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

Line 27, claim 11 (formerly claim 101) should read:

11. The optical device as claimed in claim 6, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

Line 34, claim 12 (formerly claim 107) should read:

12. The optical device as claimed in claim 6, wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

Line 39, claim 13 (formerly claim 113) should read:

13. The optical device as claimed in claim 6, wherein said reflection film comprises one selected from:  
a dielectric multilayered film; and  
a film lower in refractive index than said light guide.

Line 60, claim 16 (formerly claim 86) should read:

16. An optical device as claimed in claim 14 further comprising a reflection film provided on the lower surface of said optical control layer, wherein the electrode comprising the periodic electrodes is provided on a lower surface of said reflection film.

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Column 35.

Line 12, claim 18 (formerly claim 88) should read:

18. The optical device as claimed in claim 16, wherein said electrode having periodic electrodes disposed in alternation is provided for each display pixel unit, and each of said divided display pixel units has a switching device.

Line 16, claim 19 (formerly claim 96) should read:

19. The optical device as claimed in claim 16, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

Line 24, claim 20 (formerly claim 102) should read:

20. The optical device as claimed in claim 16, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

Line 31, claim 21 (formerly claim 108) should read:

21. The optical device as claimed in claim 16, wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

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Line 36, claim 22 (formerly Claim 114) should read:

22. The optical device as claimed in claim 16, wherein said reflection film comprises one selected from:  
a dielectric multilayered film; and  
a film lower in refractive index than said light guide.

## Column 36.

Line 7, claim 27 (formerly claim 121) should read:

27. A display apparatus as claimed in claim 23 further comprising a transparent electrode provided between said light guide and an optical control layer as a first electrode, and a reflection film provided on the lower surface of said optical control layer, wherein the electrode having periodic electrodes comprises a second electrode and is provided on a lower surface of said reflection film.

Line 31, claim 29 (formerly claim 125) should read:

29. The display apparatus as claimed in claim 27, wherein at least one of said first electrode and said second electrode comprises an electrode group divided into strips, when both of said first electrode and said second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

Line 40, claim 30 (formerly claim 128) should read:

30. The display apparatus as claimed in claim 27, wherein at least one of said first electrode and said second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

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Line 44, claim 31 (formerly claim 138) should read:

31. The display apparatus as claimed in claim 27, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

Line 52, claim 32 (formerly claim 144) should read:

32. The display apparatus as claimed in claim 27, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

Line 59, claim 33 (formerly claim 150) should read:

33. The display apparatus as claimed in claim 27, wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

## Column 37.

Line 1, claim 35 (formerly claim 162) should read:

35. The display apparatus as claimed in claim 27, wherein said illumination means has at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.

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Line 7, claim 36 (formerly claim 129) should read:

36. A display apparatus as claimed in claim 23 further comprising a reflection film provided on the lower surface of said optical control layer, wherein the electrode comprising periodic electrodes is disposed on a lower surface of said reflection film.

Line 30, claim 38 (formerly claim 131) should read:

38. The display apparatus as claimed in claim 36, wherein said electrode having periodic electrodes disposed in alternation is provided for each of display pixel units, and each of said display pixel units has a switching device.

## Column 38,

Line 3, claim 39 (formerly claim 139) should read:

39. The display apparatus as claimed in claim 36, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

Line 8, claim 40 (formerly claim 145) should read:

40. The display apparatus as claimed in claim 36, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

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Line 15, claim 41 (formerly claim 151) should read:

41. The display apparatus as claimed in claim 36, wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

Line 24, claim 43 (formerly claim 163) should read:

43. The display apparatus as claimed in claim 36, wherein said illumination means has at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.

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2. An optical device according to claim 1 wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal changing in refractive index or absorptivity or scattering degree by an electric field applied by said first electrode and said second electrode, which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

Line 37, claim 3 (formerly claim 51) should read:

3. The optical device as claimed in claim 2, wherein at least one of said first electrode and second electrode comprises an electrode group divided into strips, when both of said first electrode and second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

Line 45, claim 4 (formerly claim 58) should read:

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Line 55, claim 6 (formerly claim 78) should read:

6. An optical device as claimed in claim 1 further comprising a reflection film provided on the lower surface of said optical control layer, wherein said second electrode is provided on a lower surface of said reflection film.

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8. The optical device as claimed in claim 6, wherein at least one of said first electrode and said second electrode comprises an electrode group divided into strips, when both of said first electrode and said second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

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Line 27, claim 11 (formerly claim 101) should read:

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Line 34, claim 12 (formerly claim 107) should read:

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Line 39, claim 13 (formerly claim 113) should read:

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Line 24, claim 20 (formerly claim 102) should read:

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Line 31, claim 29 (formerly claim 125) should read:

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Line 40, claim 30 (formerly claim 128) should read:

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Line 52, claim 32 (formerly claim 144) should read:

32. The display apparatus as claimed in claim 27, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

Line 59, claim 33 (formerly claim 150) should read:

33. The display apparatus as claimed in claim 27, wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

## Column 37.

Line 1, claim 35 (formerly claim 162) should read:

35. The display apparatus as claimed in claim 27, wherein said illumination means has at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.

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## Column 38,

Line 3, claim 39 (formerly claim 139) should read:

39. The display apparatus as claimed in claim 36, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

Line 8, claim 40 (formerly claim 145) should read:

40. The display apparatus as claimed in claim 36, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

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FORM PTO 1050 (REV. 3-82)

13 DEC 2004



# UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 6,819,393 B1  
DATED : November 16, 2004  
INVENTOR(S) : Date et al.

Page 8 of 8

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Line 15, claim 41 (formerly claim 151) should read:

41. The display apparatus as claimed in claim 36, wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

Line 24, claim 43 (formerly claim 163) should read:

43. The display apparatus as claimed in claim 36, wherein said illumination means has at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.

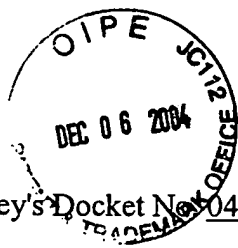
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Tel Charlotte Office (704) 444-1000

PATENT NO. 6,819,393 B1

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Attorney's Docket No. 041309/262110

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Munekazu Date, et al.  
Appl. No.: To Be Assigned  
Filed: Concurrently Herewith  
For: OPTICAL DEVICE AND  
DISPLAY APPARATUS

Box Patent Application  
Commissioner for Patents  
Washington, DC 20231

July 8, 2003

**PRELIMINARY AMENDMENT**  
**37 CFR § 1.115**

Dear Sir:

Please amend the above-identified application as follows:

**In The Specification:**

Please rewrite the paragraph beginning on page 1, line 1, as follows:

**CROSS-REFERENCE TO RELATED APPLICATION(S)**

This application is a divisional of U.S. Patent Application No. 09/361,856 filed July 27, 1999 which, in turn, is based on Patent Application Nos. 212,780/1998 filed July 28, 1998 in Japan and 247,871/1998 filed on September 2, 1998 in Japan, the content of all of which is incorporated hereinto by reference.

**In The Claims:**

Please cancel Claims 1-12, 14-27, 30-43, 45-50, 52-57, 61-68, 72-77, 80, 81, 83, 84, 89-94, 97-100, 103-106, 109-112, 115-120, 123, 124, 126, 127, 132-137, 140-143, 146-149, 152-155, 158-161, 164 and 165 without prejudice to presentation in divisional applications. Please amend Claims 44, 51, 58, 69, 78, 82, 85, 86, 88, 95, 96, 101, 102, 107, 108, 113, 114, 121, 125, 128, 129, 131, 138, 139, 144, 145, 150, 151, 156, 157, 162 and 163 as follows:

44. (Amended) An optical device according to Claim 13 wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal changing in refractive index or absorptivity or scattering degree by an electric field applied by said first electrode and said second electrode, which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

51. (Amended) The optical device as claimed in Claim 44, wherein at least one of said first electrode and second electrode comprises an electrode group divided into strips, when both of said first electrode and second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

58. (Amended) The optical device as claimed in Claim 44, wherein at least one of said first electrode and second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device..

69. (Amended) The optical device as claimed in Claim 44, wherein said optical device receives light from an illumination means having at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.

78. (Amended) An optical device as claimed in Claim 13 further comprising a reflection film provided on the lower surface of said optical control layer, wherein said second electrode is provided on a lower surface of said reflection film.

82. (Amended) The optical device as claimed in Claim 78, wherein at least one of said first electrode and said second electrode comprises an electrode group divided into strips, when both of said first electrode and said second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

85. (Amended) The optical device as claimed in Claim 78, wherein at least one of said first electrode and said second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

86. (Amended) An optical device as claimed in Claim 28 further comprising a reflection film provided on the lower surface of said optical control layer, wherein the electrode comprising the periodic electrodes is provided on a lower surface of said reflection film.

88. (Amended) The optical device as claimed in Claim 86, wherein said electrode having periodic electrodes disposed in alternation is provided for each display pixel unit, and each of said divided display pixel units has a switching device.

95. (Amended) The optical device as claimed in Claim 78, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

96. (Amended) The optical device as claimed in Claim 86, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

101. (Amended) The optical device as claimed in Claim 78, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

102. (Amended) The optical device as claimed in Claim 86, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

107. (Amended) The optical device as claimed in Claim 78, wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

108. (Amended) The optical device as claimed in Claim 86, wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

113. (Amended) The optical device as claimed in Claim 78, wherein said reflection film comprises one selected from:

- a dielectric multilayered film; and
- a film lower in refractive index than said light guide.

114. (Amended) The optical device as claimed in Claim 86, wherein said reflection film comprises one selected from:

- a dielectric multilayered film; and
- a film lower in refractive index than said light guide.

121. (Amended) A display apparatus as claimed in Claim 59 further comprising a transparent electrode provided between said light guide and an optical control layer as a first electrode, and a reflection film provided on the lower surface of said optical control layer, wherein the electrode having periodic electrodes comprises a second electrode and is provided on a lower surface of said reflection film.

125. (Amended) The display apparatus as claimed in Claim 121, wherein at least one of said first electrode and said second electrode comprises an electrode group divided into strips, when both of said first electrode and said second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

128. (Amended) The display apparatus as claimed in Claim 121, wherein at least one of said first electrode and said second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

129. (Amended) A display apparatus as claimed in Claim 54 further comprising a reflection film provided on the lower surface of said optical control layer, wherein the electrode comprising periodic electrodes is disposed on a lower surface of said reflection film.

131. (Amended) The display apparatus as claimed in Claim 129, wherein said electrode having periodic electrodes disposed in alternation is provided for each of display pixel units, and each of said display pixel units has a switching device.

138. (Amended) The display apparatus as claimed in Claim 121, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

139. (Amended) The display apparatus as claimed in Claim 129, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

144. (Amended) The display apparatus as claimed in Claim 121, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

145. (Amended) The display apparatus as claimed in Claim 129, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

150. (Amended) The display apparatus as claimed in Claim 121, wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

151. (Amended) The display apparatus as claimed in Claim 129, wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

156. (Amended) The display apparatus as claimed in Claim 121, wherein said reflection film comprises a film lower in refractive index than a dielectric multilayered film or said light guide.

157. (Amended) The display apparatus as claimed in Claim 129, wherein said reflection film comprises a film lower in refractive index than a dielectric multilayered film or said light guide.

162. (Amended) The display apparatus as claimed in Claim 121, wherein said illumination means has at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.

163. (Amended) The display apparatus as claimed in Claim 129, wherein said illumination means has at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.



### REMARKS

The present application is a divisional application and a cross-reference to the parent application has therefore been added to the specification. As will be noted, this divisional application has been filed to pursue the groups of claims identified as Groups V and VII and a portion of the group of claims identified as Group II in the restriction requirement issued in the parent application. The independent claims of Group VII, i.e., independent Claims 78, 86, 121 and 129, have been amended to depend from a respective independent claim of Group V, i.e., independent Claims 13, 28 and 59, such that the amended set of claims is directed to a single invention. With respect to the portion of the claims of Group II that are included in this divisional application, independent Claim 44 and its dependent claims, namely, dependent Claims 51, 58 and 69, have been included, although Claim 44 has been also amended to depend from an independent claim of Group V, that is, to depend from independent Claim 13. Thus, all of the claims in this divisional application were either initially classified in Group V or have been amended to depend from a claim of Group V.

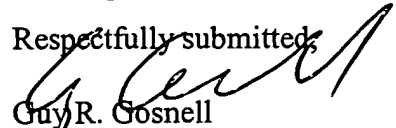
The claims have also been amended to cancel the original claims that do not correspond to either Groups V and VII or the portion of the claims of Group II that are included in this divisional application, such that Claims 13, 28, 29, 44, 51, 58-60, 69-71, 78, 79, 82, 85-88, 95, 96, 101, 102, 107, 108, 113, 114, 121, 122, 125, 128-131, 138, 139, 144, 145, 150, 151, 156, 157, 162 and 163 remain. A number of the remaining claims have also been amended to remove the multiple dependencies and to correct minor informalities. Thus, Applicants request entry of this Preliminary Amendment prior to examination and prior to calculation of the filing fee.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are

In re: Munekazu Date, et al.  
Appl. No.: To Be Assigned  
Filed: Concurrently Herewith  
Attorney Docket No. 041309/262110  
Page 9

hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

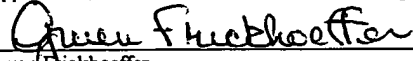
Respectfully submitted,

  
Guy R. Gosnell  
Registration No. 34,610

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"Express Mail" Mailing Label Number EV 034185153 US  
Date of Deposit: July 8, 2003

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Box Patent Application, Commissioner for Patents, Washington, DC 20231.

  
Gwen Fickhoeffer

**Version With Markings to Show Changes Made:**

**In the Specification:**

Please rewrite the paragraph beginning on page 1, line 1, as follows:

**CROSS-REFERENCE TO RELATED APPLICATION(S)**

This application is a divisional of U.S. Patent Application No. 09/361,856 filed July 27, 1999 which, in turn, is based on Patent Application Nos. 212,780/1998 filed July 28, 1998 in Japan and 247,871/1998 filed on September 2, 1998 in Japan, the content of all of which is incorporated hereinto by reference.

**In The Claims:**

Please cancel Claims 1-12, 14-27, 30-43, 45-50, 52-57, 61-68, 72-77, 80, 81, 83, 84, 89-94, 97-100, 103-106, 109-112, 115-120, 123, 124, 126, 127, 132-137, 140-143, 146-149, 152-155, 158-161, 164 and 165 without prejudice to presentation in divisional applications. Please amend Claims 44, 51, 58, 69, 78, 82, 85, 86, 88, 95, 96, 101, 102, 107, 108, 113, 114, 121, 125, 128, 129, 131, 138, 139, 144, 145, 150, 151, 156, 157, 162 and 163 as follows:

44. (Amended) [A display apparatus comprising an] An optical device according to Claim 13 wherein [and a illumination means for applying light to said optical device;

said optical device having an end surface for incident light from said illumination means, a light transmissive plate-shaped light guide for guiding incident light, an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first electrode, a periodic electrode provided as a second electrode having a periodic structure provided on a lower surface of said optical control layer for inducing a fine periodic structure for light diffraction in said optical control layer, and a substrate provided on a lower surface of said second electrode,

wherein at least one of said first electrode and said second electrode has a periodic structure for inducing a fine periodic structure for light diffraction in said optical control layer, and]

said optical control layer [changes in refractive index or absorptivity or scattering degree by an applied electric field, and] is made of a reverse mode polymer dispersed liquid crystal changing in refractive index or absorptivity or scattering degree by an electric field applied by said first electrode and said second electrode, which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

51. (Amended) The [display apparatus] optical device as claimed in Claim 44, wherein at least one of said first electrode and second electrode comprises an electrode group divided into strips, when both of said first electrode and second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

58. (Amended) The [display apparatus] optical device as claimed in Claim 44, wherein at least one of said first electrode and second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device..

69. (Amended) The [display apparatus] optical device as claimed in Claim 44, wherein said optical device receives light from an illumination means [has] having at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.

78. (Amended) An optical device as claimed in Claim 13 further comprising [a light transmissive plate-shaped light guide for guiding light incident from an end surface, an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent

electrode provided as a first electrode,] a reflection film provided on [a] the lower surface of said optical control layer, [a] wherein said second electrode is provided on a lower surface of said reflection film[, and a substrate provided on a lower surface of said second electrode,

wherein at least one of said first electrode and said second electrode has a periodic structure for inducing a fine periodic structure for light diffraction in said optical control layer, and

said optical control layer changes in refractive index or scattering degree or absorbance by an electric field applied by said first electrode and said second electrode].

82. (Amended) The optical device as claimed in Claim 78 [or 79], wherein at least one of said first electrode and said second electrode comprises an electrode group divided into strips, when both of said first electrode and said second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

85. (Amended) The optical device as claimed in Claim 78 [or 79], wherein at least one of said first electrode and said second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

86. (Amended) An optical device as claimed in Claim 28 further comprising [a light transmissive plate-shaped light guide for guiding light incident from an end surface, an optical control layer provided on a lower surface of said plate-shaped light guide,] a reflection film provided on [a] the lower surface of said optical control layer, wherein the electrode comprising the periodic electrodes is [having periodic structures disposed in alternation and] provided on a lower surface of said reflection film[for inducing a fine periodic structure for light diffraction in said optical control layer, and a substrate provided on a lower surface of said electrode having periodic electrodes disposed in alternation.

wherein said optical control layer changes in refractive index or scattering degree or

absorbance by an electric field applied by said electrode having periodic electrodes disposed in alternation].

88. (Amended) The optical device as claimed in Claim 86 [or 87], wherein said electrode having periodic electrodes disposed in alternation is provided for each [of] display pixel [units]unit, and each of said divided display pixel units has a switching device.

95. (Amended) The optical device as claimed in Claim 78 [or 79], wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

96. (Amended) The optical device as claimed in Claim 86 [or 87], wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

101. (Amended) The optical device as claimed in Claim 78 [or 79], wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

102. (Amended) The optical device as claimed in Claim 86 [or 87], wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

107. (Amended) The optical device as claimed in Claim 78 [or 79], wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

108. (Amended) The optical device as claimed in Claim 86 [or 87], wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

113. (Amended) The optical device as claimed in Claim 78 [or 79], wherein said reflection film comprises one selected from:

- a dielectric multilayered film; and
- a film lower in refractive index than said light guide.

114. (Amended) The optical device as claimed in Claim 86 [or 87], wherein said reflection film comprises one selected from:

- a dielectric multilayered film; and
- a film lower in refractive index than said light guide.

121. (Amended) A display apparatus as claimed in Claim 59 further comprising [an optical device and a illumination means for applying light to said optical device,

said optical device having an end surface for incident light from said illumination means, a light transmissive plate-shaped light guide for guiding incident light, an optical control layer provided on a lower surface of said light guide through] a transparent electrode provided between said light guide and an optical control layer as a first electrode, and a reflection film provided on [a] the lower surface of said optical control layer, wherein the electrode having periodic electrodes comprises a second electrode and is provided on a lower surface of said reflection film[, and a substrate provided on a lower surface of said second electrode,

wherein at least one of said first electrode and said second electrode has a periodic structure for inducing a fine periodic structure for light diffraction in said optical control layer, and

said optical control layer changes in refractive index or scattering degree or absorbance by an electric field applied by said first electrode and said second electrode].

125. (Amended) The display apparatus as claimed in Claim 121 [or 122], wherein at least one of said first electrode and said second electrode comprises an electrode group divided into strips, when both of said first electrode and said second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

128. (Amended) The display apparatus as claimed in Claim 121 [or 122], wherein at least one of said first electrode and said second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

129. (Amended) A display apparatus as claimed in Claim 54 further comprising [an optical device and a illumination means for applying light to said optical device,

said optical device having an end surface for incident light from said illumination means, a light transmissive plate-shaped light guide for guiding incident light, an optical control layer provided on a lower surface of said plate-shaped light guide,] a reflection film provided on [a] the lower surface of said optical control layer, wherein the [an] electrode comprising periodic electrodes is disposed [in alternation having a periodic structure provided] on a lower surface of said reflection film [for inducing a fine periodic structure for light diffraction in said optical control layer, and a substrate provided on a lower surface of said electrodes disposed in alternation,

wherein said optical control layer changes in refractive index or scattering degree or absorbance by an electric field applied by said periodic electrodes disposed in alternation].

131. (Amended) The display apparatus as claimed in Claim 129 [or 130], wherein said electrode having periodic electrodes disposed in alternation is provided for each of display pixel units, and each of said display pixel units has a switching device.



138. (Amended) The display apparatus as claimed in Claim 121 [or 122], wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

139. (Amended) The display apparatus as claimed in Claim 129 [or 130], wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

144. (Amended) The display apparatus as claimed in Claim 121 [or 122], wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

145. (Amended) The display apparatus as claimed in Claim 129 [or 130], wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

150. (Amended) The display apparatus as claimed in Claim 121 [or 122], wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

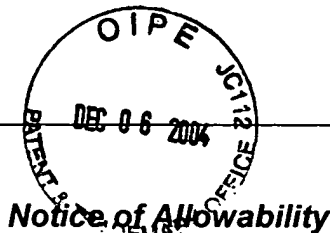
151. (Amended) The display apparatus as claimed in Claim 129 [or 130], wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.

156. (Amended) The display apparatus as claimed in Claim 121 [or 122], wherein said reflection film comprises a film lower in refractive index than a dielectric multilayered film or said light guide.

157. (Amended) The display apparatus as claimed in Claim 129 [or 130], wherein said reflection film comprises a film lower in refractive index than a dielectric multilayered film or said light guide.

162. (Amended) The display apparatus as claimed in Claim 121 [or 122], wherein said illumination means has at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.

163. (Amended) The display apparatus as claimed in Claim 129 [or 130], wherein said illumination means has at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.



<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/615,571	DATE ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Andrew Schechter	2871	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the filing of 19 February 2004.
2. ☒ The allowed claim(s) is/are 13, 28, 29, 44, 51, 58-60, 69-71, 78, 79, 82, 85-88, 95, 96, 101, 102, 107, 108, 113, 114, 121, 122, 125, 128-131, 138, 139, 144, 145, 150, 151, 156, 157, 162 and 163.
3. ☒ The drawings filed on 8 July 2003 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/361,856.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date <u>7/8/03</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                    |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material                             | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|  | 9. <input type="checkbox"/> Other _____.   |

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Guy R. Gosnell, Reg. No. 34,610, on 8 June 2004.

The application has been amended as follows:

#### In the Claims:

In claim 129, "as claimed in Claim 54" has been replaced with --as claimed in Claim 59--.

Claims 156 and 157 have been amended as follows:

- ✓ 156. (Twice amended) The display apparatus as claimed in Claim 121, wherein said reflection film comprises one selected from: a dielectric multi-layered film; and a film lower in refractive index than said light guide.
- ✓ 157. (Twice amended) The display apparatus as claimed in Claim 129, wherein said reflection film comprises one selected from: a dielectric multi-layered film; and a film lower in refractive index than said light guide.

**In the Title:**

The title has been changed to "Optical device and display apparatus using light diffraction and light guide".

**In the Abstract:**

The abstract has been replaced with the following:

An optical device and a display apparatus of the present invention are constructed so as to improve display characteristics of output light intensity, display contrast, and reduction of scattered light due to external light, and also to provide a large-screen. The optical device has a first stacked body and a plurality of second stacked bodies. The first stacked body includes a light guide, a first electrode, and an optical control layer. The second stacked body includes a plurality of second electrodes, the reflection film and a substrate. At least one of said first electrode and said second electrode has a periodic structure for inducing a fine periodic structure for light diffraction in said optical control layer.

**In the Specification:**

On page 1, lines 1-2, "U.S. Patent Application No. 09/361,856 filed July 27, 1999" has been replaced with --U.S. Patent Application No. 09/361,856 filed July 27, 1999, now U.S. Patent No. 6,618,104--.

**End of Examiner's Amendment.**